

CLAIMS

1. A method of controlling a radio link (RL) in a mobile radio network (PLMN) for maintaining a high data transmission rate, wherein the mobile radio network (PLMN) includes at least one cell (C1) that has a number of radio channels accessible for radio connection to a corresponding number of mobile stations (MS) within the cell, said method comprising the steps of

5 10 - channel coding (S1) a stream of user data to which redundant information is added, in accordance with a first channel coding scheme;

- transmitting (S2) said stream on a first frequency hopping radio channel (FH_RCH);

15 - measuring (S3) the transmission quality on the first radio channel (FH_RCH);

- switching (S6) from the first channel coding scheme to a second channel coding scheme that does not add redundant information to said stream of user data; and wherein said method is

20 **characterised** by the further step of

- switching (S5) radio channels for sending said stream from the first radio channel (FH_RCH) to a second non frequency hopping radio channel (NH_RCH) in conjunction with said change of channel coding scheme.

25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 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3. A method according to Claim 1, wherein transmission on said first or said second radio channel takes place within

said cell (C1) even when the mobile radio network includes several cells.

4. A method according to Claim 3, wherein prior to carrying out the steps according to Claim 1 said number of radio channels are divided into a group of frequency hopping radio channels (FH_RCH) and a group of non frequency hopping radio channels (NH_RCH).

10 5. A method according to Claim 4, wherein carrier waves (f_c , $f_{c1}-f_{c3}$) for said radio channels are divided into two groups, of which one group has solely said frequency hopping radio channels (FH_RCH) and the other group has solely said non frequency hopping radio channels (NH_RCH).

15 6. A method according to Claim 1, wherein said first channel coding scheme corresponds to CS1, CS2 or CS3 according to GPRS, and wherein said second channel coding scheme corresponds to CS4 according to GPRS.

20 7. A method according to Claim 1, wherein said radio link (RL) includes an uplink and a downlink which are controlled separately in accordance with the method steps.

25 8. A method according to Claim 7, wherein said measurement is effected in downlink in said mobile station (MS) and the measurement result is sent in uplink on PACCH for evaluation.

30 9. A method according to Claim 7, wherein a switch is made from said first channel to said second channel for both uplink and downlink when said switch is made from said first coding scheme to said second coding scheme on at least either the uplink or the downlink.

10. A method according to Claim 1 comprising the further steps of

- measuring (S7) the transmission quality on said second radio channel (NH_RCH);

5 - switching (S10) from said second to said first coding scheme when the transmission quality measured on the second radio channel fulfils a given criterion; and

- switching (S9) from said second radio channel to said first radio channel (FH_RCH) for transmission.

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11. A radio base system (BSS) adapted to control at least one radio link (RL) in a given cell for connection to a mobile station (MS) within said cell, wherein a number of radio channels are allocated to said cell and divided into frequency hopping and non frequency hopping channels, said system comprising

- means for measuring transmission quality on said radio link (RL); and

- means for changing a coding scheme for user data sent on said radio link (RL) in accordance with the measured transmission quality, wherein said system is

characterised by

- means that when changing a coding scheme from coded to uncoded transmission of user data functions to also change a radio channel for said radio link (RL) from a frequency hopping radio channel to a non frequency hopping radio channel (FH_RCH, NH_RCH).

20 12. A base station controller that comprises a switch connection, and a base transceiver station connection (BTS) **characterised by** means for carrying out the method according to any one of Claims 1-10.

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13. A method of controlling a radio link (RL) in a mobile radio network (PLMN) for maintaining a high data transmission rate, comprising the steps of

- channel coding a stream of user data to which redundant information is added in accordance with a first channel coding scheme;

5 - radio transmitting said stream, wherein the transmitter antenna for said radio transmission alternates between two antennas that are separated spatially or with respect to 10 polarisation so as to obtain antenna diversity;

- measuring (S3) the transmission quality of the radio 15 transmission; and

- switching (S6) from the first coding scheme to a second coding scheme that does not include the addition of redundant information to said stream of user data;

15 **characterised** by the further step of

- effecting radio transmission without switching the transmission antenna.

20 14. A method according to Claim 13, wherein antenna switching is effected for each time slot (TS).

25 15. A method of controlling a radio link to enable a high user data rate to be transmitted on the link, in a mobile communication system supporting GPRS and having four alternate channel coding schemes, the first three of said four coding schemes adding redundant information when applied to a stream of user data and a fourth of said four coding schemes adding no redundant information when applied to a 30 stream of user data, comprising the steps of:

- channel coding a first stream of user data, according to any of said first three coding schemes, to produce a first coded user data stream;

- transmitting said first coded user data stream on a first frequency hopping radio channel in a first cell;
- measuring the transmission quality on said first radio channel;

5 - changing the coding scheme for coding said first user data stream from any of said first three coding schemes to said fourth coding scheme, to produce an uncoded user data stream, due to the transmission quality reaching a first threshold value;

10 - changing the radio channel for the transmission of said uncoded user data stream, from said first radio channel to a second, non frequency hopping, radio channel, within the first cell.

15 16. A method according to Claim 18 further comprising the steps of:

- measuring the transmission quality on said second radio channel;
- starting channel coding of said stream of user data, due to the transmission quality on said second radio channel reaching a second threshold value;
- changing radio channel for said transmission from said second radio channel to a third frequency hopping radio channel, in connection to said starting channel coding.

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17. A radio base system arranged to control a radio link to a mobile station in a certain cell, wherein a number of radio channels are allocated to the cell and the number of radio channels are divided into a group of frequency hopping channels and a group of non frequency hopping radio channels, comprising,
30 a receiver to measure the transmission quality on said radio link,

a processor to select a coding scheme in relation to the measured transmission quality, and

a processor for channel coding a stream of user data sent on the radio link according to a selected coding scheme,

5 means to change radio channel for the radio link from a first frequency hopping radio channel to a second non frequency hopping radio channel when a change of channel coding is made from any of said first three channel coding schemes to said fourth of said coding schemes.

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18. A base station controller comprising,
a connection to a switch,
a connection to a radio base station, and through the radio
base station connection to at least one mobile station,
means to execute the method according to claim 18.

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